Strengthening Resin Composite With Single or Multiple Glass Fibre-Reinforced Posts

Michou, Stavroula; Benetti, Ana Raquel; Larsen, Liselotte

Publication date:
2018

Strengthening Resin Composite With Single or Multiple Glass Fibre-Reinforced Posts

Objectives: To investigate the strengthening of resin composite by single or multiple, clustered glass fibre-reinforced composite posts.
Methods: Rectangular specimens (10 mm x 2 mm x 2 mm) of flowable dual-cure resin composite (Rebilda DC QuickMix, VOCO GmbH) were prepared using one of two glass fibre-reinforced composite post systems: single posts (Rebilda Post no. 15, ø 1.5 mm, VOCO GmbH) or multiple, clustered posts (Rebilda Post GT no. 12, ~ ø 1.4 mm). A group of specimens composed only of resin composite was used as negative control. Specimens fabricated for each group (n = 10) were stored in water at 37°C for 24 h, and then subjected to three-point mini flexural strength test. Flexural strength and modulus were calculated and the data was submitted to analysis of variance followed by Tukey's HSD multiple comparison test (α = 0.05). Furthermore, the presence of internal defects in the failed specimens was assessed qualitatively using optical coherence tomography (OCT).
Results: The incorporation of posts significantly strengthened the composite build-ups (single posts: 264.5 ± 41.4 MPa; multiple, clustered posts: 195.9 ± 51.6 MPa) compared to the negative control group (131.4 ± 21.5 MPa) ($p < 0.01$). Higher modulus was calculated when using single post (5.7 ± 0.6 GPa) ($p < 0.01$), but remained unchanged when multiple, clustered posts were employed (4.0 ± 0.5 GPa) in comparison to the control (3.6 ± 0.4 GPa) ($p > 0.05$). Significantly higher flexural strength and modulus was obtained by using single rather than multiple, clustered posts ($p < 0.01$). Inspection of the failed specimens by OCT often showed air inclusions within the composite or between the composite and the multiple posts, in contrast to fewer air inclusions when single posts were used.
Conclusions: The use of multiple, clustered posts resulted in significant strengthening of resin composite build-ups, though to a lesser extent than single posts. If multiple, clustered posts are selected, special attention should be given during insertion into the composite to minimize air inclusions.

Division: IADR/PER General Session
Meeting: 2018 IADR/PER General Session (London, England)
Location: London, England

Year: 2018
Final Presentation ID: 2969

Authors
- **Michou, Stavroula** (University of Copenhagen , Copenhagen Copenhagen , Denmark)
- Benetti, Ana (University of Copenhagen , Copenhagen Copenhagen , Denmark)
- Larsen, Liselotte (University of Copenhagen , Copenhagen Copenhagen , Denmark)

Support Funding Agency/Grant Number: This research was partially supported by VOCO GmbH, Germany.
Financial Interest Disclosure: NONE

SESSION INFORMATION
Poster Session
Instruments and Equipment III
Saturday, 07/28/2018 , 11:00AM - 12:15PM